REMARKS

The claims are claims 1, 4, 5, 13, 15, 16, 23, 24 and 27 to 30.

The application has been amended at many locations to correct minor errors and to present uniform language throughout. These amendments include a SUMMARY OF THE INVENTION that was originally omitted.

Claims 1, 4, 13 and 15 are amended. Claims 2, 3, 6 to 12, 14, 17 to 22, 25 and 26 are canceled. New claims 27 to 30 are added. Claims 1 and 13 are amended to change "a data operation" to "each data operation." Claim 4 is amended to incorporate limitations of canceled claim 3 and to depend upon claim 1. Claim 15 is amended to incorporate limitations of canceled claim 14 and to depend upon claim 13. New claims 27 to 30 correspond to claims 15 and 16 except dependent upon respective claims 23 and 24.

Claims 1 to 12 were rejected under 35 U.S.C. 112 as indefinite. The OFFICE ACTION at paragraph 8 states:

> "It is not clear from the claim what is meant by "data processing operation" and how the "trace indicative of data processing operation" is different from the "program counter trace". The specification discloses "data processing operation" (on Pg.8, tine 6) but fails to detail any information about what this trace constitutes and any need for a separate trace."

The Applicants respectfully submit that no such "separate trace" is recited or implied.

Mann (U.S. Patent No. 6,009,270) teaches "captured software trace data that reflects instruction execution flow in a processor" at column 1, lines 30 and 31. It is known in the art that each such instruction execution referred to in this portion of Mann results in a data processing operation corresponding to that

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instruction. Claim 1 recites this as a data processing operation rather than as instruction execution as taught in Mann. However, these refer to same function of data processing operation in response to an executed instruction.

Claim 1 does not recite any "need for a separate trace." Claim 1 recites "providing trace information...including identifying a program counter value." This is the same trace information provided by Mann, that is the program counter value of an executed instruction. Accordingly, claim 1 is not indefinite and is proper under 35 U.S.C. 112.

Claims 1 to 10 and 12 were rejected under 35 U.S.C. 102(e) as anticipated by Mann U.S. Patent No 6,009,270.

Claim 1 recites subject matter not anticipated by Mann. Claim 1 recites "identifying a program counter value" and "expressing said corresponding program counter value as an offset which indicates a number of program counter values in the program counter trace stream by which said corresponding program counter value is offset from said synchronization marker in said program counter trace stream." The OFFICE ACTION cites Mann at column 13, lines 56 to 62 as teaching "that branching causes disruption in the flow and non-data dependent branching...can be represented in a form of an offset indicating whether the branch was taken or not." Mann states at column 13, lines 56 to 62:

> "Preferably, only instructions which disrupt the instruction flow are reported; and further, only those where the target address is in some way data dependent. For example, such 'disrupting' events include call instructions or unconditional branch instructions in which the target address is provided from a data register or other memory location such as a stack."

This portion of Mann fails to teach the claimed "offset which indicates a number of program counter values in the program counter

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trace stream by which said corresponding program counter value is offset from said synchronization marker." The claimed synchronization marker is not mentioned in this portion of Mann. There is no mention of reporting the program counter value based upon "a number of program counter values" difference with such a synchronization marker. Mann states at column 14, lines 7 to 16:

"FIG. 6A illustrates an exemplary format for reporting conditional branch events. In the disclosed embodiment of the invention, the outcome of up to 15 branch events can be grouped into a single trace entry. The 16-bit TDATA field (or 'BFIELD') contains 1-bit branch outcome trace entries, and is labeled as a TCODE=0001 entry. The TDATA field is initially cleared except for the left most bit, which is set to 1. As each new conditional branch is encountered, a new one bit entry is added on the left and any other entries are shifted to the right by one bit."

The "exemplary format for reporting conditional branch events" includes a bit for each such conditional branch indicating it was taken or not taken. This portion of Mann likewise fails to teach the claimed synchronization marker, or the claimed offset. Mann states at column 15, lines 8 to 15 (including the portion cited in the OFFICE ACTION):

"When processing a trace stream in accordance with the invention, trace address values are combined with a segment base address to determine an instruction's linear address. The base address, as well as the default data operand size (32 or 16-bit mode), are subject to change. As a result, the TCODE=0011 and 0111 entries are configured to provide the information necessary to accurately reconstruct instruction flow."

This portion of Mann teaches that the trace address values are an offset that is combined with a segment base address "to determine an instruction's linear address." This portion of Mann teaches providing "the information necessary to accurately reconstruct

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instruction flow." Thus a change in segment base address is communicated as part of the trace stream. This portion of Mann includes no teaching that a synchronization marker is the same as the segment base address. For example, Mann teaches providing a new synchronization marker following a taken conditional branch whose target address is data in a register at column 3, lines 5 to 7. However, Mann fails to teach that the trace address values following such a synchronization marker are offset from the synchronization marker value. Instead, Mann teaches that the trace address values are offset from the prior and still unchanged segment base address. Accordingly, claim 1 is not anticipated by Mann.

Claim 4 recites subject matter not anticipated by Mann. Claim 4 recites "counting detected occurrences of program counter loads." Mann states at column 16, lines 35 to 55 (including the portion cited in the OFFICE ACTION):

"Referring to FIG. 7, in operation, a counter 701 is set to the value contained in the synchronization register TSYNC 703 whenever a synchronizing trace entry (e.g., containing a branch target address) is generated. Trace control logic 218 determines when a synchronizing trace entry is generated and provides load signal 705 whenever such addresses are generated. This can be summarized as follows. The counter is decremented by one for each TCODE=1, thus providing for a maximum number of consecutive conditional branch instructions.

"Thus, counter 701 is reloaded each time a target address is generated or other appropriate TCODE is generated indicating a synchronizing record has been provided. Counter 701 is decremented by one for trace entries not having an address. If the counter reaches zero, an indication 707 is asserted by counter 701 and provided to trace control 218. In response, trace control 218 causes a trace entry to be inserted with a code indicating that it is a synchronization entry (TCODE=0110) and a current program address. The current program address can be, e.g., the most recently retired instruction."

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This portion of Mann teaches that the value loaded into the counter 701 is "the value contained in the synchronization register TSYNC 703." This portion of Mann further teaches the value in counter 701 "is decremented by one for trace entries not having an address." Thus counter 701 is loaded when a program counter load causing a program counter discontinuity occurs. However, counter 701 thereafter counts down for continuous program counter operation, i.e. trace entries "not having an address." Thus the value of counter 701 cannot be the number of program counter loads. Note further that counter 701 is loaded with the value of the synchronization register TSYNC 703 not only upon program counter loads ("each time a target address is generated") but also upon "other appropriate TCODE is generated indicating a synchronizing record has been provided." Thus counter 701 does not store a number of program counter loads and is loaded with the synchronization register TSYNC 703 value upon other conditions in addition to program counter loads. Accordingly, claim 4 is allowable over Mann.

Claim 5 recites subject matter not anticipated by Mann. Claim 5 recites "maintaining a running count of a number of program counter loads that have occurred since insertion of the synchronization marker." Such a count requires a counter to be zeroed upon each synchronization marker and incremented upon each detection of a program counter load. Mann teaches that counter 701 is loaded with the synchronization register TSYNC 703 value each time a target address is generated. This occurs upon a program counter load and other conditions. The counter 701 is then decremented on execution of instructions not requiring a new trace address. Thus counter 701 clearly cannot hold the running count recited in claim 5. Accordingly, claim 5 is allowable over Mann.

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Claims 13 to 22 were rejected under 35 U.S.C. 103(a) as made obvious by the combination of Sites, U.S. Patent No. 5,764,885, and Mann, U.S. Patent No. 6,009,270.

Claim 13 recites subject matter not made obvious by the combination of Sites and Mann. Claim 13 recites "said program counter identifier operable for expressing said corresponding program counter value as an offset which indicates a number of program counter values in the program counter trace stream by which said corresponding program counter value is offset from said synchronization marker in said program counter trace stream." The OFFICE ACTION cites the same portions of Mann as cited against claim 1 as teaching this limitation. Mann likewise fails to teach the synchronization marker or the offset recited in claim 13. Mann teaches that the trace address values are an offset with a segment base address. Mann includes no teaching that a synchronization marker is the same as the segment base address. Mann teaches providing a new synchronization marker following a taken conditional branch but fails to teach that the trace address values following such a synchronization marker are offset from the synchronization marker value. Instead, Mann teaches that the trace address values are offset from the prior and still unchanged segment base address. The OFFICE ACTION does not allege that Sites adds any teaching to Mann to make obvious this limitation. Accordingly, claim 13 is allowable over the combination of Sites and Mann.

Claim 15 recites subject matter not made obvious by the combination of Sites and Mann. Claim 15 recites "counting detected occurrences of program counter loads." The OFFICE ACTION cites the same portions of Mann as cited against claim 4 as teaching this limitation. Mann teaches that the value loaded into the counter 701 is "the value contained in the synchronization register TSYNC 703" and that the value in counter 701 "is decremented by one for

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trace entries not having an address." Thus the value of counter 701 cannot be the number of program counter loads. Note further that counter 701 is loaded with the value of the synchronization register TSYNC 703 not only upon program counter loads ("each time a target address is generated") but also upon "other appropriate TCODE is generated indicating a synchronizing record has been provided." Thus counter 701 does not store a number of program counter loads and is loaded with the synchronization register TSYNC 703 value upon other conditions in addition to program counter loads. The OFFICE ACTION does not allege that Sites adds any teaching to Mann to make obvious this limitation. Accordingly, claim 15 is allowable over the combination of Sites and Mann.

Claim 16 recites subject matter not made obvious by the combination of Sites and Mann. Claim 16 recites "maintaining a running count of a number of program counter loads that have occurred since insertion of the synchronization marker." Such a count requires a counter to be zeroed upon each synchronization marker and incremented upon each detection of a program counter load. The OFFICE ACTION cites the same portions of Mann as cited against claim 5 as teaching this limitation. Mann teaches that counter 701 is loaded with the synchronization register TSYNC 703 value each time a target address is generated. This occurs upon a program counter load and other conditions. The counter 701 is then decremented on execution of instructions not requiring a new trace address. Thus counter 701 clearly cannot hold the running count recited in claim 16. The OFFICE ACTION does not allege that Sites adds any teaching to Mann to make obvious this limitation. Accordingly, claim 16 is allowable over the combination of Sites and Mann.

Claims 23 to 26 were rejected under 35 U.S.C. 103(a) as made obvious by the combination of Sites, U.S. Patent No. 5,764,885,

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Mann, U.S. Patent No. 6,009,270, and Edwards, U.S. Patent No. 6,732,307.

Claims 23 and 24 recite subject matter not made obvious by the combination of Sites, Mann and Edwards. Claims 23 and 24 recite "said program counter identifier operable for expressing said corresponding program counter value as an offset which indicates a number of program counter values in the program counter trace stream by which said corresponding program counter value is offset from said synchronization marker in said program counter trace stream." The OFFICE ACTION cites the same portions of Mann as cited against claim 13 as teaching this limitation. Mann likewise fails to teach the synchronization marker or the offset recited in claims 23 and 24. Mann teaches that the trace address values are an offset with a segment base address. Mann includes no teaching that a synchronization marker is the same as the segment base address. Mann teaches providing a new synchronization marker following a taken conditional branch but fails to teach that the trace address values following such a synchronization marker are offset from the synchronization marker value. Instead, Mann teaches that the trace address values are offset from the prior and still unchanged segment base address. The OFFICE ACTION does not allege that Sites or Edwards adds any teaching to Mann to make obvious this limitation. Accordingly, claims 23 and 24 are allowable over the combination of Sites, Mann and Edwards.

New claims 27 and 29 recite subject matter of the same scope as claim 15 except dependent upon respective claims 23 and 24. Claims 27 and 29 are likewise allowable.
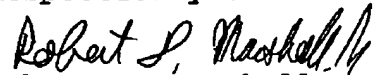
New claims 28 and 30 recite subject matter of the same scope as claim 16 except dependent upon respective claims 23 and 24. Claims 28 and 30 are likewise allowable.

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The Applicants respectfully submit that all the present claims are allowable for the reasons set forth above. Therefore early reconsideration and advance to issue are respectfully requested.

If the Examiner has any questions or other correspondence regarding this application, Applicants request that the Examiner contact Applicants' attorney at the below listed telephone number and address to facilitate prosecution.

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